

SIGNIFICANT PERMIT MODIFICATION APPLICATION:  
SOIL METHANE VACUUM SYSTEM  
NORTH UNIT OF PAGEL LANDFILL

EPA Region 5 Records Ctr.



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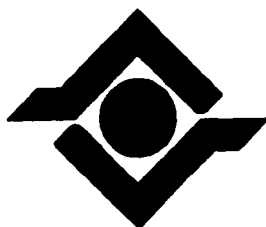
PERMIT NO. 1991-138-LF

Prepared for:

Winnebago Reclamation Services, Inc.  
Loves Park, Illinois 61111

*December 2000*

Prepared by:



**ANDREWS ENVIRONMENTAL ENGINEERING INC.**

29W100 Butterfield Road, Suite 105, Warrenville, Illinois 60555/(630) 393-9474

**SIGNIFICANT PERMIT MODIFICATION APPLICATION  
SOIL METHANE VACUUM SYSTEM  
NORTH UNIT OF PAGEL LANDFILL  
WINNEBAGO RECLAMATION SERVICES, INC.  
ROCKFORD, ILLINOIS**

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## 1.0 INTRODUCTION

The Winnebago Reclamation Services, Inc. (WRS) Pagel Landfill is an existing municipal solid waste disposal facility located approximately 4 miles south of Rockford, Illinois. The facility contains two separate disposal areas (units) that are authorized under a single operating and development permit (Permit No. 1991-138-LF). The Northern Unit is currently undergoing final closure, and the Southern Unit is the current operating unit. This Application requests approval of a "Significant Modification" (Sig Mod) to add a vacuum system at the east perimeter of the North Unit, in order to extract and vent methane gas.

WRS is currently performing closure work over a twenty-seven (27) acre portion of the east section of the North Unit. When this work is completed, the entire North Unit will have received final cover. There will be approximately twenty (20) landfill gas extraction wells placed within the east section of the North Unit, which is currently undergoing closure work. During the construction period the vacuum blower, connected to the existing wells and the newly installed wells, will only be connected to wells on previously closed portions of the landfill. The vacuum blower will be connected when construction of header piping and retrofitting of well heads is finished in the east section. Therefore, it is expected that gas pressures in the fill mass will increase. The likely avenue to vent this gas accumulation is through gas wells and the intermediate cover surface of the eastern portion of the landfill. As the clay barrier layer and the flexible membrane components are completed, this venting route for the landfill gas will be eliminated. During the closure construction period, the possibility exists that gas may migrate from the landfill into and through the adjacent subsurface strata. In order to mitigate gas migration from the landfill toward potential receptors, the owner has elected to install a soil gas venting system at the east facility boundary, which separates the landfill from inhabited dwellings.

In order to ensure the protection of human health, the system was constructed and operated prior to submission of this Sig Mod to permit. The report herein discusses the extraction system, and references pertinent information from an application for

construction and operation of the soil methane vacuum system, which was submitted to the Illinois Environmental Protection Agency (Agency), Air Permit Section.

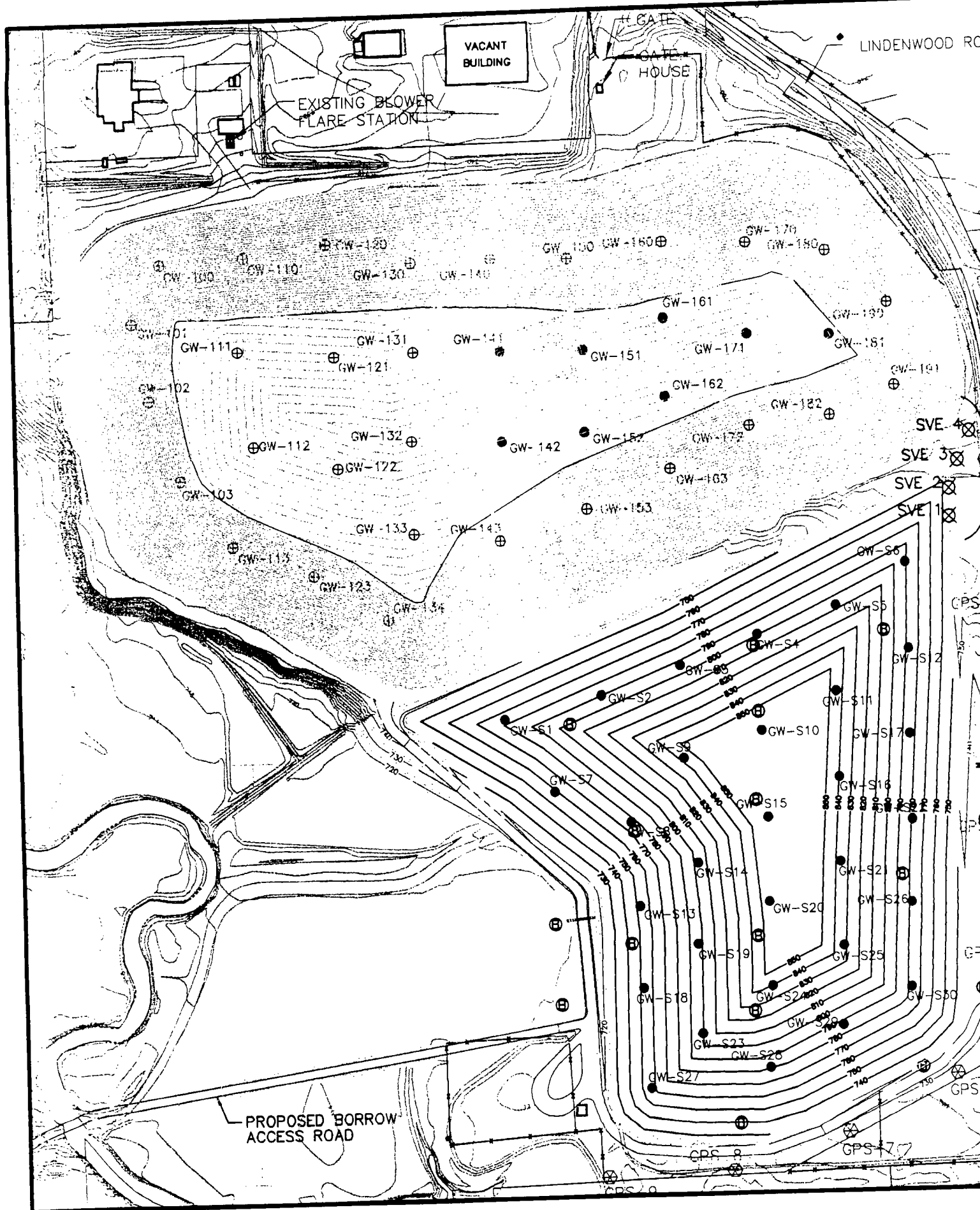
The operating schedule for the soil methane vacuum system (SMVS) commenced upon installation in late October and early November, and will run through December 2000, or until the methane gas extraction system within the last section of the North Unit resumes operation.

## **2.0 SYSTEM DESIGN AND INSTALLATION**

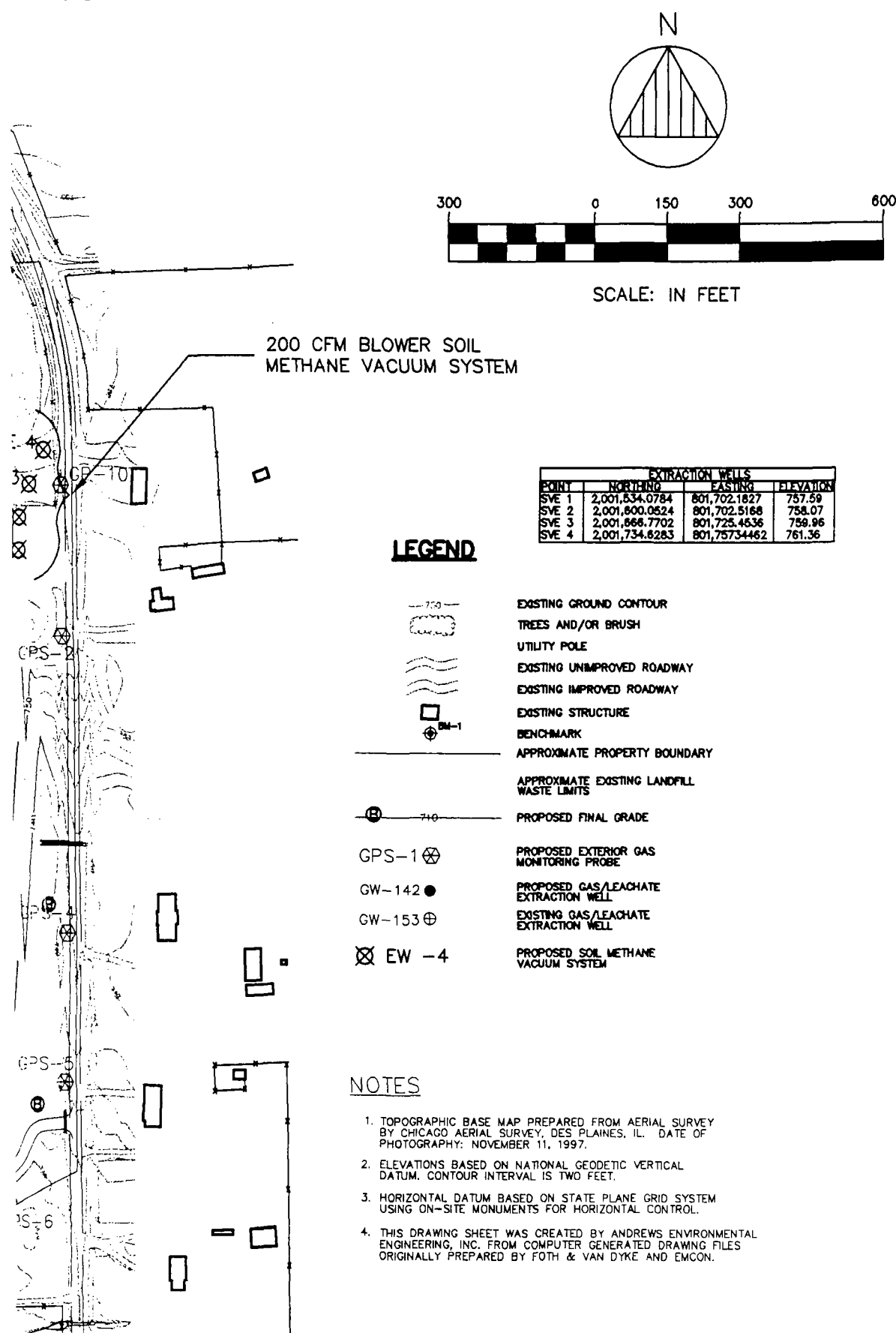
The perimeter gas venting system will consist of four extraction wells, connected by a pipe manifold system to a 200 cubic feet per minute (cfm) blower. The system is illustrated on the enclosed **Figure 1**, and described herein.

Each extraction well consists of a two-inch diameter Polyvinyl Chloride (PVC) pipe constructed within a six-inch borehole. The borehole is backfilled with coarse sand to within four and one-half (4.5) feet of ground surface and then finished with a bentonite plug. The depth of each well extends approximately forty-two (42) feet below ground surface, to the location of the groundwater table. The subsurface at each extraction well consists of sand and coarse gravel with some silt to a depth of approximately twenty (20) feet. Below twenty (20) feet from ground surface, the remainder of the well extends through limestone.

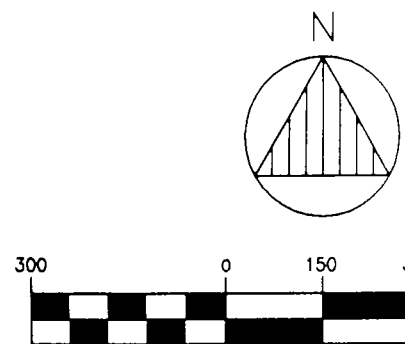
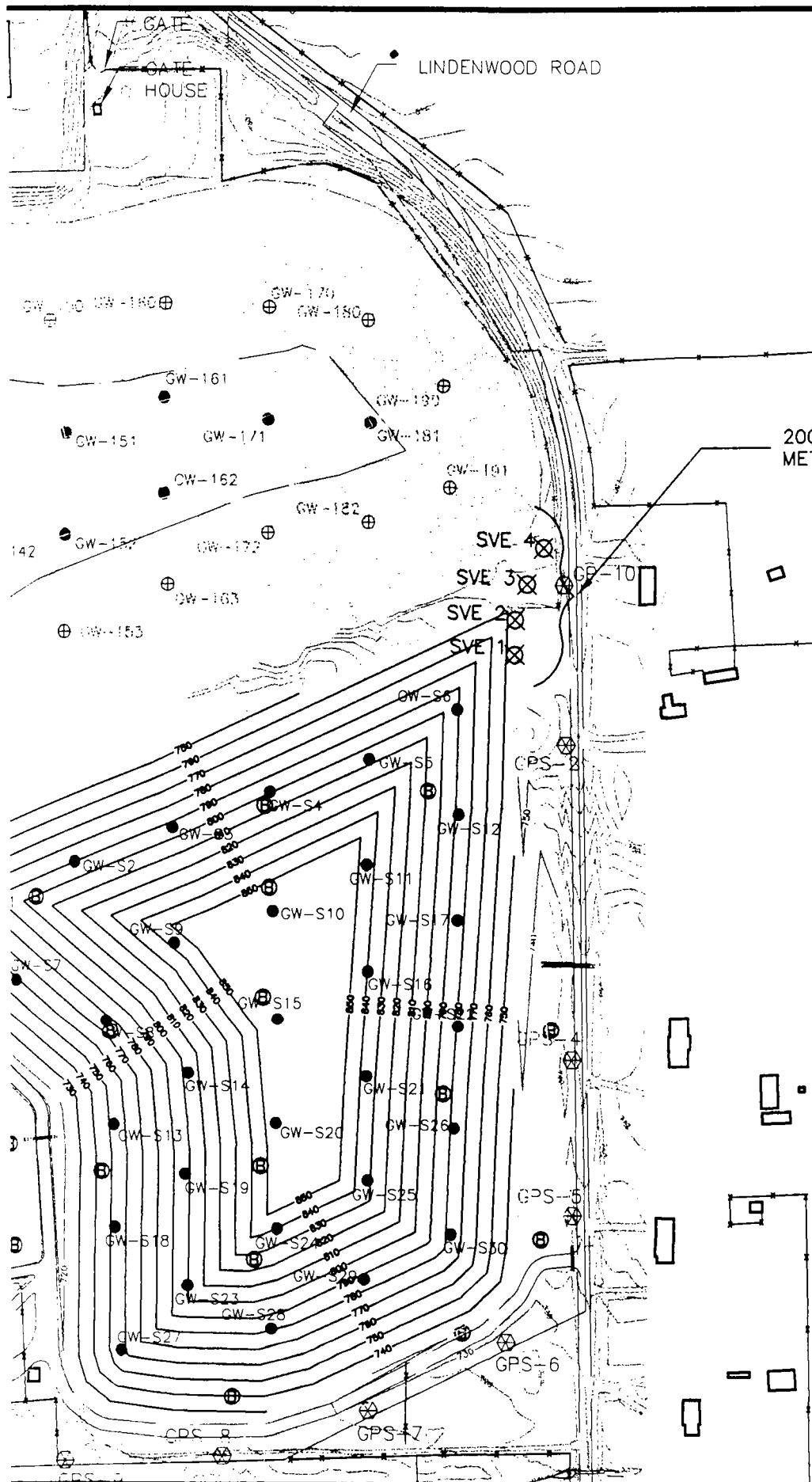
The two-inch PVC well pipes are connected to a four-inch diameter PVC header pipe using a reducing tee and two-inch diameter flexible hose. The header manifold runs above-ground to a skid-mounted five horsepower Lampson blower. The blower unit vents the collected gas into the atmosphere. A schematic detail of the extraction wells is illustrated in **Figure 2**.



300 ROAD



|  |      |             |              |     |           |
|--|------|-------------|--------------|-----|-----------|
| REVISED  |      | DESCRIPTION |              | BY  |           |
| NO.  | DATE |             |              |     |           |
| <b>ANDREWS ENVIRONMENTAL ENGINEERING, INC.</b><br>29W100 Butterfield Road, Suite 105, Warrenville, IL 60555<br>(630)393-9474 Fax (630)393-9495<br>Springfield, IL Pontiac, IL Indianapolis, IN |      |             |              |     |           |
| APPROVED BY:   |      | JPL         | DESIGNED BY: | JPL | DRAWN BY: |
| SOIL METHANE VACUUM SYSTEM<br>PLANS PREPARED FOR<br><b>WINNEBAGO RECLAMATION SERVICES, INC.</b><br>PACEL LANDFILL<br>ROCKFORD, WINNEBAGO COUNTY, ILLINOIS                                      |      |             |              |     |           |
| DATE: NOVEMBER 2000  |      |             |              |     |           |
| JOB NO.: 1990-114-0003   |      |             |              |     |           |
| FILE NO.: PL000087   |      |             |              |     |           |
| SHEET NUMBER:  |      |             |              |     |           |
| <b>FIG. 1</b>  |      |             |              |     |           |



SCALE: IN FEET

200 CFM BLOWER SOIL  
METHANE VACUUM SYSTEM

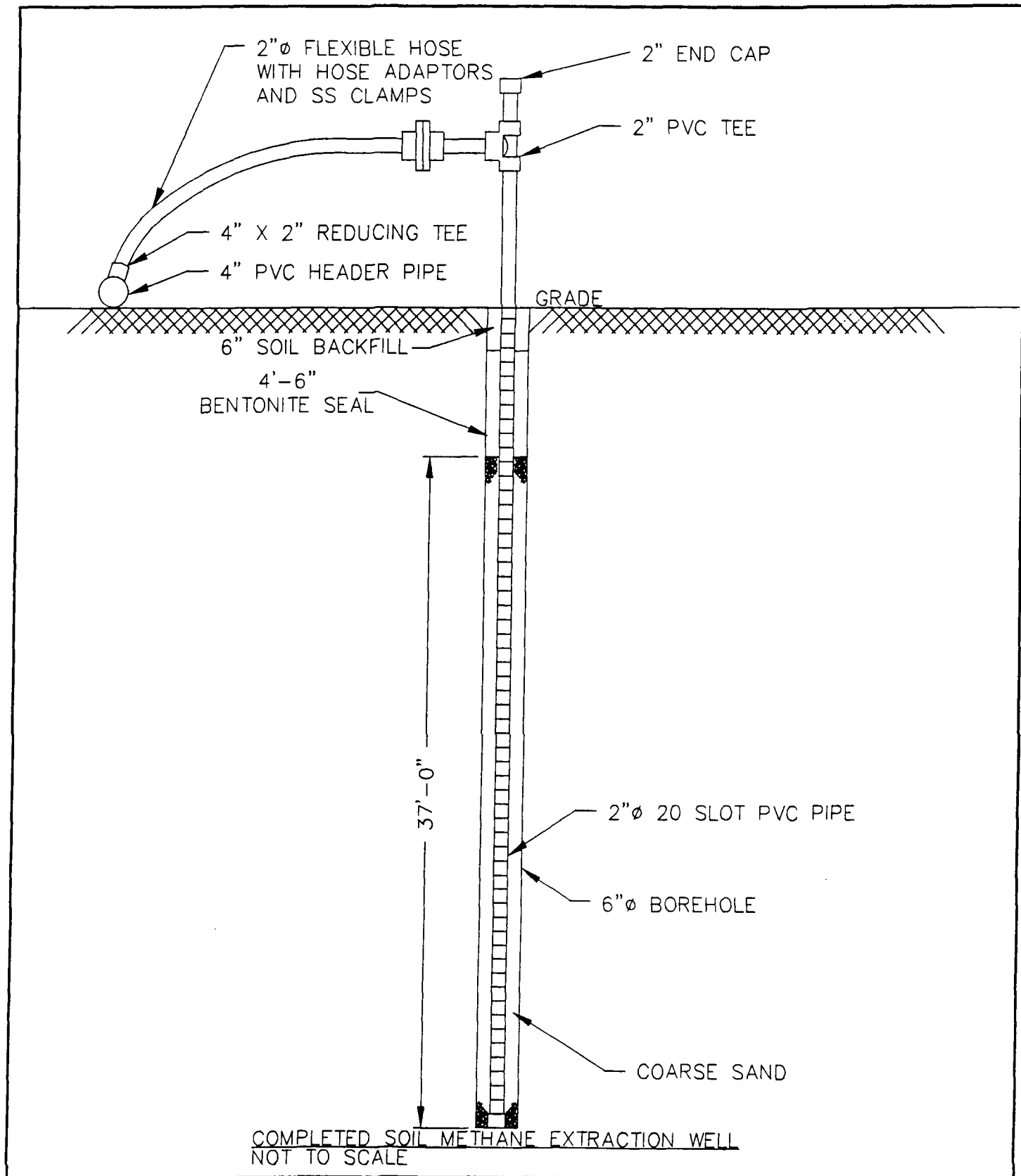
| POINT | NORTHING       | EASTING      |
|-------|----------------|--------------|
| SVE 1 | 2,001,534.0784 | 801,701.7017 |
| SVE 2 | 2,001,600.0524 | 801,701.7017 |
| SVE 3 | 2,001,666.7702 | 801,721.7017 |
| SVE 4 | 2,001,734.6283 | 801,751.7017 |

## LEGEND

- EXISTING GROUND CONTOUR
- TREES AND/OR BRUSH
- UTILITY POLE
- EXISTING UNIMPROVED ROADWAY
- EXISTING IMPROVED ROADWAY
- EXISTING STRUCTURE
- BENCHMARK
- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE EXISTING LANDFILL WASTE LIMITS
- PROPOSED FINAL GRADE
- GPS-1
- GW-142
- GW-153
- EW-4

## NOTES

- TOPOGRAPHIC BASE MAP PREPARED FROM AERIAL SURVEY BY CHICAGO AERIAL SURVEY, DES PLAINES, IL. DATE OF PHOTOGRAPHY: NOVEMBER 11, 1997.
- ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM. CONTOUR INTERVAL IS TWO FEET.
- HORIZONTAL DATUM BASED ON STATE PLANE GRID SYSTEM USING ON-SITE MONUMENTS FOR HORIZONTAL CONTROL.
- THIS DRAWING SHEET WAS CREATED BY ANDREWS ENVIRONMENTAL ENGINEERING, INC. FROM COMPUTER GENERATED DRAWING FILES ORIGINALLY PREPARED BY FOTH & VAN DYKE AND EMCON.



| SOIL METHANE EXTRACTION WELL DETAIL  |   |  |  | REVISIONS |      |             |    |
|--|---|--|--|-----------|------|-------------|----|
| SHEET NUMBER<br>51.0000088<br>11/10/00<br>1000-114-0004<br>DATE<br>NOVEMBER 2000 | PLANS PREPARED FOR<br><b>WINNEBAGO RECLAMATION SERVICES, INC.</b><br>PAGEL LANDFILL<br>ROCKFORD, WINNEBAGO COUNTY, ILLINOIS   |  |  | NO.       | DATE | DESCRIPTION | BY |
|  | <b>POWERS ENVIRONMENTAL ENGINEERING, INC.</b><br>2570100 Butterfield Road, Suite 100, Burr Ridge, IL 60526<br>(630)383-0474 Fax (630)383-0468<br>Springfield, IL Pontiac, IL Indianapolis, IN |  |  |           |      |             |    |
|  | APPROVED BY: JPL DESIGNED BY: JPL DRAWN BY: ND  |  |  |           |      |             |    |
|  |   |  |  |           |      |             |    |



### 3.0 AIR PERMIT

An application for Air Construction and Part 70 Operating Permit was submitted to the Agency in October 2000. The application demonstrated that the soil methane vacuum system (SMVS) satisfies the three criteria from Subsection (a) of 35 IAC 201.211. These are:

- 1) *SMVS emits not more than 1 lb./hr. of any regulated pollutant [not listed as hazardous according to Section 112(b)];*
- 2) *SMVS emits not more than 0.1 lb./hr. of any pollutant listed as hazardous according to Section 112(b); and*
- 3) *The SMVS emissions unit is not a process unit.*

Furthermore, the application proposes to the Agency that the emissions from the blower be treated as an insignificant activity consistent with Section 201.210 and the Pagel Landfill's Clean Air Act Permit Program, Part 70 Permit.

**April 5, 1993**

**Permit No. 1991-138-LF**

**Modification No. 1**

**Log No. 1995-015**

*In issuing modification No. 1 to Permit No. 1991-138-LF, the Agency is approving the proposed Applicable Groundwater Quality Standards (AGQS's) for the groundwater monitoring parameters for which AGQS's had not been established when Permit No. 1991-138-LF was issued.*

**August 22, 1996**

**Permit No. 1991-138-LF**

**Modification No. 2**

**Log Nos. 1995-250 & 1996-058**

*In issuing Modification No. 2 to Permit No. 1991-138-LF, the Agency is conditionally Approving the initial Significant Modification of the development and operation of the existing landfill unit (i.e., the northern unit) at this facility so as to comply with the applicable requirements of 35 IAC Parts 811 and 812, pursuant to 35 IAC, Sections 814.104, 814.301 and 814.302; and the vertical expansion of the northern unit, proposed in Log No. 1995-250.*

**April 15, 1997**

**Permit No. 1991-138-LF**

**Modification No. 3**

**Log No. 1997-013**

*The Modification No. 3 accepts a report summarizing the results of the assessment-monitoring program for the existing landfill unit at this facility.*

**June 16, 1997**

**Permit No. 1991-138-LF**

**Modification No. 4**

**Log Nos. 1997-097 and 1997-098**

*In issuing Modification No. 4, the Illinois EPA is conditionally approving: the use of lime sludge from water treatment as an alternate daily cover material in accordance with the proposal made in Log No. 1997-097; and the use of petroleum contaminated soil as an alternate daily cover material in accordance with the proposal made in Log No. 1997-098.*

**July 10, 1997**

**Permit No. 1991-138-LF**

**Modification No. 5**

**Log No. 1996-403**

*In issuing Modification No. 5, the IEPA is conditionally approving an amended groundwater corrective action plan.*

**June 18, 1998**  
**Permit No. 1991-138-LF**  
**Modification No. 6**  
**Log No. 1998-001**

*In issuing Modification No. 6 the IEPA is conditionally approving a renewal of Permit No. 1991-138-LF, pursuant to 35 IAC Part 813 Subparts B and C, and is also approving or accepting the following:*

- A. Updated closure/post closure care plans and cost estimates (Revised Total Cost Estimate: \$4,090,121.00);*
- B. A revision to the methods used to construct the final cover system;*
- C. Revisions to the design of the surface water drainage system and final contours of the northern unit; and*
- D. An acceptance report documenting that approximately 16.6 acres of final cover have been applied to the western portion of the northern unit and that in this 16.6 acre area the appurtenances associated with closure (i.e., surface water control structures and gas and leachate extraction devices) have also been installed.*

**July 31, 1998**  
**Permit No. 1991-138-LF**  
**Modification No. 7**  
**Log No. 1998-138**

*Modification No. 7 conditionally approves the use of processed landscape waste from off-site facilities as an alternate daily cover.*

**January 12, 1999**  
**Permit No. 1991-138-LF**  
**Modification No. 8**  
**Log No. 1998-138**

*Modification No. 8 revises the leachate-monitoring network for the Northern Unit by replacing the two-leachate storage tanks with four leachate/gas extraction wells.*

**May 19, 1999**  
**Permit No. 1991-138-LF**  
**Modification No. 9**  
**Log Nos. 1998-081 and 1998-433**

*Modification No. 9 conditionally approves/accepts the following changes/demonstrations, requested or provided in the application, Log No. 1998-081, regarding the Southern Unit:*

- A. Changes to the design of the Southern Unit increasing its waste capacity from approximately 2.43 million cubic yards to approximately 3.14 million cubic yards and increasing its maximum final elevation from 846 AMSL to 856 ft AMSL;*

- B. Revised closure and post closure care plans and cost estimates totaling \$1,915,823.40;*
- C. A new analysis of foundation and mass stability;*
- D. Revised design of the liner system;*
- E. Revised design of the leachate drainage, collection and management system;*
- F. Development of a landfill gas extraction/collection/management system;*
- G. Revised design of the final cover system;*
- H. A demonstration that the revisions to the designs of the liner and final cover systems will not increase the leakage rate and therefore, a revised groundwater impact assessment (GIA) is not necessary; and*
- I. Revisions to the groundwater monitoring well network to reflect installation of replacement wells.*

**August 17, 1999**

**Permit No. 1991-138-LF**

**Modification No. 10**

**Log No. 1999-191**

*Modification No. 10 conditionally approves low flow groundwater sampling techniques in accordance with the application Log No. 1999-191.*

**November 12, 1999**

**Permit No. 1991-138-LF**

**Modification No. 11**

**Log No. 1999-320**

*Modification No. 11 to Permit No. 1991-138-LF conditionally approves*

- A. Operating authorization allowing waste disposal in Phase 1 of the South Unit, shown in drawings 1-7 in the application designated as Log No. 1999-320*
- B. Acceptance reports for the following structures in Phase 1: liner foundation, compacted soil liner, geomembrane liner, leachate collection system, leachate management system and stormwater control structures: and*
- C. A revised Construction Quality Assurance (CQA) program to be used when High Density polyethylene (HDPE) liner is installed at this facility in the application designated as log No. 1999-235*

**June 13, 2000**

**Permit No. 1991-138-LF**

**Modification No. 12**

**Log No. 2000-043**

*Modification No. 12 conditionally approves the revision to the closure cost estimate for the South Unit.*

**August 18, 2000**  
**Permit No. 1991-138-LF**  
**Modification No. 13**  
**Log No. 2000-119**

*Modification No. 13 conditionally approves the use of shredded construction and demolition materials and broken glass as an alternate daily cover.*

**March 29, 2001**  
**Permit No. 1991-138-LF**  
**Modification No. 14**  
**Log no. 2000-467**

*Modification No. 14 to permit No. 1991-138-LF approves the revised groundwater monitoring well designations.*

**April 13, 2001**  
**Permit No. 1991-138-LF**  
**Modification No. 15**  
**Log No. 2000-469**

*Modification No. 15 is to permit No. 1991-138-LF approves the installation of the soil methane vacuum system as described in Log No. 2000-469.*

**June 28, 2001**  
**Permit No. 1991-138-LF**  
**Modification No. 16**  
**Log No. 2001-086**

*Modification No. 16 is to permit No. 1991-138-LF approves the development of the leachate force main for the south unit as described in Log No. 2001-086.*

**October 4, 2001**  
**Permit N. 1991-138-LF**  
**Modification No. 17**  
**Log Nos. 2000-488, 2001-164 and 2001-241**

*Modification No. 17 to permit No. 1991-138-LF approves the time extension to complete final cover construction on the Northern Unit as described in Log No. 2000-488, the slope revision of the north perimeter berm of the Southern Unit as described in Log No. 2001-164, and the deletion of wells G455 and G45D as described in Log No. 2001-241.*

**January 9, 2002**  
**Permit No. 1991-138-LF**  
**Modification No. 18**  
**Log No. 2001-384**

*Modification No. 18 to permit No. 1991-138-LF approves the construction acceptance report for Phase III of the Southern Unit as described in Log No. 2001-384. Consequently, operation (i.e., waste disposal) in Phase III is permitted.*

**May 31, 2002**  
**Permit N. 1991-138-LF**  
**Modification No. 17**  
**Log Nos. 2001-360**

*Modification No. 19 to permit No. 1991-138-LF approves the construction acceptance report for closures of the eastern end of the North Unit, revised final cover design , and revised closure/post-closure care cost estimates for the North and South Units.*

**August 22, 2002**  
**Permit N. 1991-138-LF**  
**Modification No. 20**  
**Log Nos. 2002-136**

*Modification No. 20 to permit No. 1991-138-LF approves the installation of an additional landfill gas flare at the Pagel Landfill Facility*